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EXAMINER

LIN, JAMES

ART UNIT PAPER NUMBER

1762

DATE MAILED: 12/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/760,524

Applicant(s)

WANG, WEI-HONG

Examiner

Jimmy Lin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 October 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 and 26-33 is/are pending in the application.
- 4a) Of the above claim(s) 2,4-7,10-17 and 31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,8,9,26-30,32 and 33 is/are rejected.
- 7) ☒ Claim(s) 28 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Newly submitted claim 31 is directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: the claim is directed to Species 1 in the Office Action filed 4/4/2006; in addition, claim 31 is dependent on a withdrawn claim.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 31 is withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

### *Claim Objections*

2. Claim 28 is objected to because of the following informalities: “/Ti(OR)<sub>4</sub>” should be changed to “Ti(OR)<sub>4</sub>”. Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, 3, 8-9, 26-30, and 32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 1 recites the limitation "the TiO<sub>2</sub> gel" in lines 7 and 8. There is insufficient antecedent basis for this limitation in the claim. The TiO<sub>2</sub> gel will be interpreted to be the TiO<sub>2</sub>-SCA gel.

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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7. Claim 30 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

There is no support for wherein the  $\text{TiO}_2$ -SCA gel is  $\text{H}_x\text{TiO}_{[(3-x)/2+x]}\text{-SCA}$ . The specification only provides support for wherein the  $\text{TiO}_2$ -SCA gel is  $\text{H}_y\text{TiO}_{[(4-y)/2+y]}/\text{H}_x\text{TiO}_{[(3-x)/2+x]}\text{-SCA}$ , or  $\text{H}_y\text{TiO}_{[(4-y)/2+y]}\text{-SCA}$  (pg. 9, lines 1-2).

### *Claim Rejections - 35 USC § 103*

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1, 3, 8-9, 30, and 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakatsu (6,242,862) in view of Nakabayashi (EP 1,136,125). Toki et al. (U.S. Publication 2004/0197254) is cited as evidence of inherency.

Kawakatsu discloses a method of fabricating a photocatalytic fluorescent lamp (Fig. 12) comprising:

combining titanium alkoxide with acetylacetone (i.e., a strong chelating agent (SCA), see [0030] of Toki as evidence of inherency) in aqueous solution (col. 15, lines 7-15) to form  $\text{TiO}_2$ -SCA gel;

forming semiconductor nano-anatase  $\text{TiO}_2$  sol (column 9, lines 35-37);

dip coating the nano-crystalline anatase sol (column 15, lines 15-16) on a surface of a fluorescent lamp tube (Fig. 12);

baking said fluorescent lamp tube coated with nano-crystalline anatase sol to form a photocatalytic coating fluorescent lamp (column 4, line 23) capable of cleaning air (column 1, lines 17-18)

wherein baking step is carried out at a temperature above 200 °C (column 4, line 23).

Kawakatsu does not explicitly teach the step of peptizing the  $\text{TiO}_2$  gel by adjusting the pH and that forming crystalline  $\text{TiO}_2$  particles via a hydrothermal process.

Nakabayashi teaches a method of making a photocatalyst comprising of titanium oxide sol. The method of making the titanium oxide sol includes a peptizing process with ammonia and a hydrothermal treatment thereafter [0039]. The selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have included a peptizing process and a hydrothermal treatment in the method of making the titanium oxide sol of Kawakatsu with a reasonable expectation of success because Nakabayashi teaches that such processes are suitable in the method of making titanium oxide sol.

Considering that the materials used in forming the nano-crystalline anatase sol and the baking temperature are substantially the same as those disclosed and claimed by applicant, the brightness of the photocatalytic coating fluorescent lamp would inherently increase, unless some critical steps are missing from the claims. In addition, a small amount of UVA and blue light from the fluorescent lamp would inherently be absorbed by the anatase coating.

Claims 3,32: Nakabayashi teaches that the peptizing process can be carried out using ammonia [0039].

Claim 8: Kawakatsu teaches that a normal fluorescent lamp can be used (Fig. 12).

Claim 9: The fluorescent lamp is a straight tube (Fig. 12).

Claim 30: Kawakatsu teaches a  $\text{TiO}_2$ -SCA gel having the formula  $\text{H}_y\text{TiO}_{[(4-y)/2+y]}$ , wherein y equals 0.

10. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakatsu '862 in view of Nakabayashi '125 as applied to claim 1, and further in view of Rengakuji et al. (U.S. Patent 6,602,607).

Kawakatsu and Nakabayashi are discussed above, but do not explicitly teach a titanium alkoxide, wherein the R of  $\text{Ti}(\text{OR})_4$  is a hydrocarbon group,  $\text{C}_n\text{H}_{2n+1}$ , where  $n=1-5$ . However, Rengakuji teaches that such titanium alkoxides are well known for their use to make titanium dioxide as a photocatalyst (abstract; col. 3, lines 31-35). The selection of something based on its

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known suitability for its intended use has been held to support a prima facie case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have used one of the titanium alkoxides as taught by Rengakuji as the particular titanium alkoxide of Kawakatsu with a reasonable expectation of success because Rengakuji teaches that such alkoxides are suitable for use as a photocatalyst.

11. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakatsu '862 in view of Nakabayashi '125 as applied to claim 1, and further in view of Mori et al. (U.S. Patent 6,420,437).

Kawakatsu and Nakabayashi are discussed above, but do not explicitly teach that the chelating agents can be acetonacetate, amino acid, succinic acid, or an organic alcohol [RC<sub>6</sub>H<sub>3</sub>(OCH<sub>3</sub>OH)]. However, Mori teaches the use of succinic acid as a chelating agent in the method of making titanium oxide sol. The selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have used succinic acid as the particular chelating agent of Kawakatsu with a reasonable expectation of success because Mori teaches that such a chelating agent is suitable in the art of making titanium oxide sol.

12. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakatsu '862 in view of Nakabayashi '125 as applied to claim 1, and further in view of Boykin et al. (U.S. Publication 2004/0112411).

Kawakatsu and Nakabayashi are discussed above, but do not explicitly teach that the chelating agents can be acetonacetate, amino acid, succinic acid, or an organic alcohol [RC<sub>6</sub>H<sub>3</sub>(OCH<sub>3</sub>OH)]. However, Boykin teaches that amino acids are well-known chelating agents. The selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). Therefore, it would have been obvious to one of ordinary skill

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in the art at the time of invention to have used succinic acid as the particular chelating agent of Kawakatsu with a reasonable expectation of success because Mori teaches that amino acids are suitable chelating agents.

13. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakatsu '862 in view of Nakabayashi '125 as applied to claim 1, and further in view of Baiker et al. (U.S. Patent 5,935,895).

Kawakatsu and Nakabayashi are discussed above, but do not explicitly teach that the molar ratio of the chelating agent and the titanium alkoxide has a molar ratio of 0.01-1.0. However, Baiker teaches that titanium alkoxide and the chelating agent can have a molar ratio between about 1:2 and about 3:1. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have used the a ratio between 1:2 and 3:1 of the titanium alkoxide to the chelating agent with a reasonable expectation of success because Baiker teaches that such molar ratios are suitable for such a mixture. In addition, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical (MPEP 2144.05.II.A.). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have looked to the prior art for a conventional or known molar ratio for the mixture of chelating agent and titanium alkoxide.

14. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakatsu '862 in view of Nakabayashi '125 as applied to claim 1, and further in view of Tabatabaie-Raissi et al. (U.S. Patent 6,309,611).

Kawakatsu and Nakabayashi do not explicitly teach that the titanium alkoxide is combined with chelating agents and a water-based aqueous solution. However, Tabatabaie-Raissi teaches the combination of titanium alkoxide, ethanol, and acetylacetone (i.e., a chelating agent) with water in the method of making a photocatalytic device (col. 9, lines 57-65). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have added water to the titanium alkoxide/acetylacetone solution of Kawakatsu with a

reasonable expectation of success because Tabatabaie-Raissi teaches that such an aqueous solution is suitable in making a photocatalytic device.

***Response to Arguments***

15. Applicant's arguments filed 10/26/2006 have been fully considered but they are not persuasive.

Claims 1, 3, 8, and 9 as rejected over Kawakatsu '862:

The Applicant argues that without the ground layer 2 to help hold the TiO<sub>2</sub> anatase particle, the TiO<sub>2</sub> anatase particle cannot adhere to the lamp at a temperature of 200 °C. However, the claims do not exclude the use of such a ground layer.

The Applicant argues that the adhesive ability of the TiO<sub>2</sub> anatase particle of Kawakatsu is not sufficient for use in the present invention because Kawakatsu teaches a baking temperature of 450 °C. However, the claim requires that the baking step is carried out at a temperature of 100-250 °C. While Kawakatsu exemplifies temperature ranges higher than the claimed range, Kawakatsu also explicitly teaches that the baking step can be carried out above 200 °C. Thus, Kawakatsu teaches an overlapping temperature range of 200-250 °C.

The Applicant argues that Kawakatsu cannot coat the finished lamp product but simply coats the glass tube only because the lamp is baked at a temperature of 400-600 °C. Although Kawakatsu exemplifies such a temperature range, taking the reference as a whole, Kawakatsu fairly teaches that the baking temperature can be also carried out at other temperature ranges, such as above 200 °C. As to being unable to coat a finished lamp, Kawakatsu does not teach that coating a finished lamp is inoperable in the temperature ranges as taught therein. Also, there is no evidence indicating that the temperature ranges as taught by Kawakatsu would render such a process inoperable. On the other hand, Kawakatsu does teach a temperature range that overlaps the claimed range, and, thus, a finished lamp could be coated using at least such overlapping ranges.



*Conclusion*

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Wiederhoft et al. (5,840,111) discloses a process for making nanodisperse titanium dioxide.

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jimmy Lin whose telephone number is 571-272-8902. The examiner can normally be reached on Monday thru Friday 8AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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**KEITH HENDRICKS**  
**PRIMARY EXAMINER**